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ABSTRACT

This essay considers whether the brain can accelerate the speed with which it absorbs or dispenses information in ways similar to those of a computer, and, if so, whether any of these speed-up approaches increase the speed of the processing of the information in the brain. It is suggested that there are tasks for which speed is important in both cybernetic and human information processing, and that the brain uses concepts, pronouns, and metaphors to speed up information processing in much the same way as the computer uses a shortened program, a lower level language, or a change in the central processing unit. In addition, the human and the computer can work in parallel, with the computer performing lower level tasks, while the human decides priorities or performs other tasks of higher level thinking. It is concluded that the human information processor and the computer are metaphors for each other, and that their relationships are equations rather than vectors since they can be mutually influential. (EW)

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On Flying to the Starting Line But Walking The Race:

An Illumination of the Computer-Mind Metaphor

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On Flying to the Starting Line But Walking the Race: An Illumination of the Computer- Mind Metaphor

It may be informative to ask whether the brain can accelerate the speed with which it absorbs or dispenses information in ways similar to those of a computer. If it can, do any of these speed up approaches increase the speed of processing of the information in the brain?

When I use my personal computers (a Commodore 64 and an expanded VIC 20), there are several ways that I can speed up how quickly a program loads into the machine. I can use similar approaches to quickly save a program to tape or disk. Most of these acceleration techniques do not help the program run more quickly once it is in the computer.

Some Speed-ups for Information Loading

It is possible to reduce the length of a program that is to be loaded. One method of doing this is to store separately what is repeated within the program so that it is written once but used many times. In a similar manner the reader does this when he reads a word which represents a description of an event. "Mardi Gras" may for example represent several pages of smells, sounds, tastes and pictures for the reader or listener. Later in the same passage, "it" may stand in for the ideas. The computer will process this more quickly and

place it in a shorter time in memory storage - as will the human.

Another approach to speeding up the loading of information from tape or disk is to through the use of software disable the error checking devices in the hardware program that drive the tape or disc loading. Although some errors may result in loading, the process is much quicker. Many students while reading for meaning will name a synonym for the word that is actually in front of them. If the word they name is synonymous with the one written, little meaning is lost. Sometimes error checking devices are necessary for both computers and humans. If the reader has been fooled by configuration clues into reading "thought" for "taught", then confusion may result. A computer may "crash" if an incorrect command is read. In many cases though, redundant "failsafe" checkers can be removed without a great increase in the probability of machine or human misinterpretation.

An imitation of quickly entering information into a computer would be to load it at the normal rate and then to retain it in memory via an eprom cartridge or a battery powered ram cartridge or a ram drive. In each of these cases, the program can be accessed almost instantly when required. The cartridge systems guarantee that the information is not lost when the computer is turned off.

A ram drive's memory is extinguished, however, when the computer loses its power. The closest human analog of this might be the test taker who loads his short term memory immediately before a test and then writes whatever has been memorized as soon as the test begins.

What might be comparable to the permanent memory cartridge is the mantra that remains constantly in conscious memory.

Information loads or is saved more quickly when the monitor screen is turned off. While the screen memory needs to be attended to by the computer, it has little to do with the loading or saving of information. This might be similar to deciding what is critical to learn, and ignoring the rest. What comes to mind is the first step of the survey, question, read, recite, review (SQ3R) learning sequence. Following the overview of the survey, only what is relevant is attended to.

Faster Internal Handling of Information

While all of these methods speed up the acquisition or dispensing of information, none accelerate the processing of information once it is in memory. Parallel processing involves a task being divided into subsections. Each of these subproblems is assigned to a different central processing unit which works on its task while the other cpu's have the program that is dealing with the information operate in a lower level language. Programming languages which are easy to use are much "wordier" than lower level ones which communicate exclusively with numerals. A compromise is a compiled high language program. The compilation process converts the English like higher language to a more compact, and faster, code, which is the equivalent of a lower level language.

A very expensive method of speeding up the processing of information within the computer is to replace its core or central processing unit with a faster one. A cpu tends to be faster if it has a wider "gate" for the information. Personal computers in recent years have moved from eight bit to sixteen bit to thirty-two bit gates, with a corresponding speedup in information transfer.

When we talk about powerful ideas we refer to concepts that carry a great deal of information at once, or equations which explain several situations simultaneously. Skinner's behavioristic theories might be brief statements which would allow us to process a great deal of information at once. In a sense such theories enhance the human central processing unit. We develop with each heuristic a wider "gate" through which we can move more information or the same amount of information more quickly.

Perhaps the greatest enhancement to our ability to absorb and process information is the computer, which to this point we have been simply using as a metaphor. Information can be moved more quickly with a computer than with any biological process. It is in fact a special case of parallel processing.

Several individuals might simultaneously work on different aspects of the same task . Or a person seeking the solution to a problem might have his computer perform mathematical operations or sort through lists, while the human decides priorities or performs some other task of higher level thinking.

Simultaneous processing does happen in our natural world. We frequently work on one problem while putting the other on the "back burner". Frequently the problem that we put on hold is solved by the portion of our brain that was not working in the foreground. This would be an example of background processing, since at the same time two different programs are being worked on.

Conclusion:

There are tasks for which speed is important both in cybernetic and human information processing. For both humans and machines there seem to be a number of ways that information acquisition and dispersal can be accelerated. There are a smaller number of ways that data can be processed more quickly once they have been acquired by the cpu. We can make the program shorter, use a lower level language, or change the central processing unit. The human biocomputer has the option of using concepts, pronouns or metaphors.

A number of parallel issues are suggested by, but not dealt with in this paper. Are there other methods humans use that computers might emulate, or computer approaches that we could employ?

I have dealt here with speed. It is important in handling information, but does it allow us to handle depth such as powerful concepts and metaphors? What might be a powerful concept in a cpu? How

would the computer performance be affected if it dealt with metaphors?

The computer can process in parallel with the human and enhance our thinking. When we parallel with the computer are we improving its performance? Is this what judgement is about?

The human information processor and the computer are metaphors for each other. Their relationships are equations rather than vectors since they can be mutually influential.

My computers and I both can quickly load or save information, although we usually deal with it slowly once we have it. We both rush to the starting line but frequently dawdle through the race. Perhaps it is the need to handle depth as well as speed that slows us. It may be that the athlete's race becomes the philosopher's amble for both of us.